TABLE 12

SUMMARY OF ESTIMATED ALTERNATIVE COSTS

Alternative		Estimated Costs (millions) [a]		
		Capital	O&M [b]	Total
Perched Aquifer				
P1	No Action	$0	$0	$0.0
P2	Groundwater Extraction and Treatment with Soil Cap	$0.72	$1.36	$2.1
P3	Groundwater Extraction and Treatment with Soil Cap and SVE	$1.46	$1.59	$3.0
Basal Aquifer				
B1	No Action	$0	$0	$0.0
B2	Phased Pump-and-Treat with Contingent Monitored Natural Attenuation	$4.27	$5.58	$9.9
B3	Pump-and-Treat for Both the Basal Source and Downgradient Areas	$8.73	$9.17	$17.9
Wellhead Treatment (contingency [c])		$1.77	$2.70	$4.5

[a] Costs are for mid-2001. Alternative cost estimates do not include wellhead treatment contingency.

[b] Net present value of both operating and maintenance costs during remedial action and post-remediation maintenance and monitoring.

[c] O&M assumes 10-yr operation.

Source- Feasibility Study, Del Monte Corporation (Oahu Plantation) Superfund Site, dated February 2003, prepared by Golder Associates

Table 13 Cleanup Standards for COCs in Groundwater	
Chemical of Concern	**EPA Cleanup Standard (µg/L)**
Ethylene Dibromide (EDB)	0.04[1]
1,2-Dibromo-3-Chloropropane (DBCP)	0.04[1]
1,2,3-Trichloropropane (TCP)	0.6[1]
1,2-Dichloropropane (DCP)	5[2]

[1] State of Hawaii MCL
[2] Federal EPA MCL

TABLE 14
DETAILED COST ESTIMATE RANGE FOR THE SELECTED REMEDY

Component	Quantity	Unit	Unit Cost ($)	Cost ($)
Capital Costs (including Engineering and Management)				**Capital Costs**
Perched Aquifer Remedy (Extraction[(1)] , Treatment, Soil Cap and SVE)				
Establish institutional controls	1	ls.	$130,000	**$130,000**
Mobilize/site preparation	1	ls.	$5,000	**$5,000**
Soil cap and pit backfill	1	ls.	$143,000	**$143,000**
Fencing	1000	lf.	$15	**$15,000**
Monitoring well pumps	10	ea.	$3,000	**$30,000**
Phytoremediation treatment system for IDW	1	ls.	$75,000	**$75,000**
SVE treatment system	1	ls.	$433,000	**$433,000**
RCRA Compliance	1	ls.	$20,000	**$20,000**
Perched Aquifer Capital Cost Subtotal				**$851,000**
Contractor Overhead and Profit			20%	**$170,000**
Engineering and Construction Oversight	1	ls.	$225,000	**$225,000**
Contingency (applied to capital cost subtotal only)			25%	**$213,000**
Total Perched Aquifer Capital Costs				***$1,459,000***
Basal Aquifer Remedy (Source Control with Monitored Natural Attenuation)				
Establish institutional controls	1	ls.	$50,000	**$50,000**
New 6-inch diameter monitoring wells	4	ea.	$250,000	**$1,000,000**
New 8-inch diameter monitoring wells[(2)]	2	ea.	$300,000	**$600,000**
Source Area treatment system	1	ls.	$482,000	**$482,000**
Extraction well pump and piping	1	ls.	$170,000	**$170,000**
Discharge piping and booster pump	1	ls.	$205,000	**$205,000**
RCRA Compliance	1	ls.	$30,000	**$30,000**
Alternate water supply pipieline (for HCC, if needed)	1	ls.	$210,000	**$210,000**
Basal Aquifer with MNA Capital Cost Subtotal				**$2,747,000**
Contractor Overhead and Profit			20%	**$549,000**
Engineering and Construction Oversight	1	ls.	$288,000	**$288,000**
Contingency (applied to capital cost subtotal only)			25%	**$687,000**
Total Basal Aquifer with MNA Capital Costs				***$4,271,000***
Basal Aquifer Remedy (Source Control with Downgradient Plume Extraction and Treatment)				
Establish institutional controls	1	ls.	$50,000	**$50,000**
New 6-inch diameter monitoring wells	6	ea.	$250,000	**$1,500,000**
New extraction wells	5	ea.	$300,000	**$1,500,000**
New extraction well pumps	5	ea.	$60,000	**$300,000**
New reinjection wells	2	ea.	$300,000	**$600,000**
Source Area treatment system	1	ls.	$482,000	**$482,000**
Extraction well pump and piping	1	ls.	$170,000	**$170,000**
Discharge piping and booster pump	1	ls.	$205,000	**$205,000**
Downgradient treatment system	1	ls.	$512,000	**$512,000**
Booster pump for reinjection system	1	ls.	$20,000	**$20,000**
Header piping (8-inch diameter)	4000	lf.	$20	**$80,000**
Feeder piping (6-inch diameter)	1000	lf.	$15	**$15,000**
Electrical	1	ls.	$50,000	**$50,000**
RCRA Compliance	1	ls.	$60,000	**$60,000**
Alternate water supply pipieline (for HCC, if needed)	1	ls.	$210,000	**$210,000**
Basal Aquifer with Downgradient Extraction Capital Cost Subtotal				**$5,754,000**
Contractor Overhead and Profit			20%	**$1,151,000**
Engineering and Construction Oversight	1	ls.	$388,000	**$388,000**
Contingency (applied to capital cost subtotal only)			25%	**$1,439,000**
Total Basal Aquifer with Downgradient Extraction Capital Costs				***$8,732,000***
TOTAL ESTIMATED CAPITAL COST RANGE :				***$5,730,000 to 10,190,000***
Contingent Point-of-Use Treatment				
Total Estimated Cost- fully installed, operational system, including contingency	1	ls	$1,766,000	**$1,766,000**
TOTAL ESTIMATED CAPITAL COST RANGE (w/point-of-use treatment):				**$5,730,000 to $11,960,000**

TABLE 14
DETAILED COST ESTIMATE RANGE FOR THE SELECTED REMEDY

Component	Quantity	Unit	Unit Cost ($)	Cost ($)
Annual Operations & Maintenance Costs	**Quantity**	**Units**	**Annual Cost ($)**	**Present Worth Cost [1] ($)**
Perched Aquifer Remedy (Extraction , Treatment, Soil Cap and SVE)				
Extraction/treatment system O&M & monitoring	8	yr.	$36,000	**$233,000**
SVE O&M	8	yr.	$99,000	**$640,000**
Perched aquifer monitoring	13	yr.	[4]	**$206,000**
Soil cap and fence maintenance and monitoring	8	yr.	$8,000	**$52,000**
Evaluation and reporting	13	yr.	$15,000	**$141,000**
Perched Aquifer O&M Cost Subtotal				**$1,272,000**
Contingency			25%	**$318,000**
Total Perched Aquifer Capital Costs				***$1,590,000***
Basal Aquifer Remedy (Source Control with Monitored Natural Attenuation)				
Extraction system maintenance	10	yr.	$15,000	**$116,000**
Source area treatment system O&M	10	yr.	$123,000	**$950,000**
Electricity (pumps)	10	yr.	$392,000	**$3,027,000**
Basal aquifer monitoring	15	yr.	[4]	**$268,000**
Evaluation and reporting	15	yr.	$10,000	**$104,000**
Basal Aquifer with MNA O&M Cost Subtotal				**$4,465,000**
Contingency			25%	**$1,116,000**
Total Basal Aquifer with MNA O&M Costs				***$5,581,000***
Basal Aquifer Remedy (Source Control with Downgradient Plume Extraction and Treatment)				
Source area extraction system maintenance	10	yr.	$15,000	**$116,000**
Source area treatment system O&M	10	yr.	$123,000	**$950,000**
Electricity (source area pumps)	10	yr.	$392,000	**$3,027,000**
Downgradient extraction system maintenance	5	yr.	$16,000	**$69,000**
Downgradient treatment system O&M	5	yr.	$175,000	**$758,000**
Electricity (downgradinet pumps)	5	yr.	$490,000	**$2,121,000**
Basal aquifer monitoring	15	yr.	[4]	**$193,000**
Evaluation and reporting	15	yr.	$10,000	**$104,000**
Basal Aquifer with Downgradient Extraction O&M Cost Subtotal				**$7,338,000**
Contingency			25%	**$1,835,000**
Total Basal Aquifer with Downgradient Extraction O&M Costs				***$9,173,000***
TOTAL DISCOUNTED O&M COST RANGE :				***$7,170,000 to 10,760,000***
Contingent Point-of-Use Treatment				
Total Estimated O&M Cost- fully installed, operational system	10	yr.	$350,000	**$2,700,000**
TOTAL DISCOUNTED O&M COST RANGE (w/point-of-use treatment):				**$7,170,000 to $13,460,000**
TOTAL ESTIMATED CAPITAL COST RANGE (w/point-of-use treatment):				**$5,730,000 to $11,960,000**
ESTIMATED RANGE - PRESENT WORTH COST[5]:				**$12,900,000 to 25,400,000**

Notes

(1) The perched aquifer extraction systems was already installed.

(2) These monitoring wells could potentially be converted to source area extraction wells to supplement pumping from the existing Kunia Well.

(3) Based on 5 to 15-year project and a 5% discount rate.

(4) Annual monitoring cost varies from over time, with higher costs initially and lower costs near the end.

(5) The lowest cost scenario includes monitored natural attenuation of the downgradient basal aquifer plume and no point-of-use treatment. The highest cost scenario includes full extraction and treatment of the downgradient basal aquifer plume, plus the contingent point-of-use treatment.

Capital cost estimates are not discounted because the construction work will be performed in the early stages of the project. O&M costs are reported as present worth estimates given a 5% discount rate for a duration that varies between 5 and 15 years.

Cost estimates are based on numbers of wells, extraction rates and influent quality estimates that may be refined during remedial design. Cost estimates are expected to be within a +50 to -30% accuracy range.

ls. = lump sum; ea. = each; lf. = linear feet; yr. = year

Table 15
Chemical-Specific[a] ARARs for Selected Remedy

Requirement	Citation[b]	ARAR Determination	Comments
PERCHED AQUIFER – FEDERAL			
Safe Drinking Water Act (42 U.S.C., ch. 6A, § 300[f]–300[j]-26)			
National primary drinking water standards are health-based standards (MCLs) for public water systems.	40 CFR. § 141.61(a)	Not an ARAR	The NCP defines MCLs as relevant and appropriate for groundwater determined to be a current or potential source of drinking water, in cases where MCLGs are not ARARs. The Kunia Village perched aquifer is considered a Class III aquifer (not a potential source of drinking water) because of insufficient quantity and drinking water standards are not relevant or appropriate.
Resource Conservation and Recovery Act (42 U.S.C., ch. 82, §§ 6901–6991[I])			
Defines RCRA hazardous waste. A solid waste is characterized as toxic if the waste exceeds the TCLP maximum concentrations. A solid waste can also be a hazardous waste if it contains a listed hazardous waste.	HAR Title 11 261-22(1)(3)(4), 261-24(a)(2)-(a)(8), 261-101, 261-3(a)(2)(C) or (F) 262-10, 262-11, 264-178, 264-197, 264-258, 264-288	Applicable	Applicable for determining whether either soil cuttings from well drilling or extracted groundwater is hazardous. The extracted groundwater will likely contain a listed waste and be considered hazardous under the "contained in" policy. Soil may also be hazardous waste under the "contained in" policy if it contains a listed waste or if it exceeds the criteria for characteristic hazardous waste.
PERCHED AQUIFER – STATE (No chemical-specific State ARARs have been identified for the perched aquifer)			
BASAL AQUIFER – FEDERAL			
Safe Drinking Water Act (42 U.S.C., ch. 6A, § 300[f]–300[j]-26)[c]			
National primary drinking water standards are health-based standards (MCLs) for public water systems.	40 CFR § 141.61(a)	Relevant and appropriate	The NCP defines MCLs as relevant and appropriate for groundwater determined to be a current or potential source of drinking water, in cases where MCLGs are not ARARs. MCLs are relevant and appropriate for Class II aquifers such as the Ewa-Kunia Aquifer System at the Site.

(Table continues)

Table 15 (continued)

Requirement	Citation[b]	ARAR Determination	Comments
Resource Conservation and Recovery Act (42 U.S.C., ch. 82, §§ 6901–6991[i])			
Defines RCRA hazardous waste. A solid waste is characterized as toxic if the waste exceeds the TCLP maximum concentrations. A solid waste can also be a hazardous waste if it is "listed" or if it contains a listed hazardous waste.	See the specific citations above in the Perched Aquifer part of the table.	Applicable	Applicable for determining whether soil cuttings from well drilling or extracted groundwater is hazardous. If the extracted groundwater contains Site COCs (which are listed wastes) in excess of MCLs, it will be considered hazardous under the "contained in" policy. Soil may also be hazardous waste under the "contained in" policy if it contains a listed waste or if it exceeds the criteria for characteristic hazardous waste.
Groundwater protection standards: Owners/operators of RCRA treatment, storage, or disposal facilities must comply with conditions in this chapter that are designed to ensure that hazardous constituents entering the groundwater from a regulated unit do not exceed specified concentration limits in the uppermost aquifer underlying the waste management area of concern.	HAR Title 11 264-94, except 264-94(a)(2) and 264-94(b)	Relevant and appropriate	Applicable for hazardous waste TSD facilities; potentially relevant and appropriate in site-specific circumstances, such as when a listed waste has been released. The Del Monte Site is not a TSD facility. However, because the waste in the groundwater is a listed waste, this requirement is determined to be relevant and appropriate.
BASAL AQUIFER - STATE (No chemical-specific State ARARs have been identified for the basal aquifer)			
AIR – STATE			
Hawaii Air Pollution Control Standards: Address discharge of air pollution including visible emissions, fugitive dust, incineration, process industries, sulfur oxides from fuel combustion, storage of VOCs, VOC separation from water, and waste gas disposal.	HAR Title 11, Chapter 60	Applicable	The regulation requires permits for point sources and treatment systems that exceed 0.1 tons per year of each hazardous air pollutant. The substantive provisions of these regulations will be applicable for any action that includes air discharges exceeding this threshold. At this stage, it does not appear likely that either the air stripper (basal aquifer) or the SVE treatment unit (perched aquifer) will have discharges approaching the 0.1 tons per year threshold

Notes:

[a] many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARARs tables (Table 16).

[b] only the substantive provisions of the requirements cited in this table are ARARs

[c] statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the entire statutes or policies are ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered ARARs

Acronyms/Abbreviations:

ARAR – applicable or relevant and appropriate requirement
CFR. – *Code of Federal Regulations*
ch. – chapter
COCs – contaminants of concern
HAR – Hawaii Administrative Rules
MCL – maximum contaminant level
MCLG – maximum contaminant level goal
NCP – National Oil and Hazardous Substances Pollution Contingency Plan
RCRA – Resource Conservation and Recovery Act
§ – section
SVE – soil vapor extraction
TCLP – toxicity characteristic leaching procedure
TSD – treatment, storage, and disposal
VOCs – volatile organic compounds
U.S.C. – *United States Code*

Table 16
Action-Specific ARARs[a] for Selected Remedy

Action/Requirement	Citation[b]	ARAR Determination	Comments
PERCHED AQUIFER – FEDERAL			
Resource Conservation and Recovery Act (42 U.S.C. §§ 6901–6991[i])[c]			
On-site waste generation/Person who generates waste shall determine if that waste is a hazardous waste.	HAR Title 11 262-10(a), 262-11	Applicable	Applicable for any operation where waste is generated. The determination of whether wastes generated during remedial activities, such as soil cuttings from well installation and treatment residues, are hazardous will be made when the wastes are generated.
On-site waste generation/Requirements for analyzing waste to determine whether waste is hazardous.	HAR Title 11 264-13(a) and (b)	Applicable	Applicable for any operation where waste is generated. The determination of whether wastes generated during remedial activities are hazardous will be made when the wastes are generated.
Hazardous waste accumulation/On-site hazardous waste accumulation is allowed for up to 90 days as long as the waste is stored in containers or tanks, on drip pads, inside buildings, is labeled and dated, etc.	HAR Title 11 262-34	Applicable	Applicable for any operation where hazardous waste is generated and transported. The determination of whether wastes generated during remedial action activities are hazardous will be made at the time the wastes are generated.
Hazardous waste accumulation/Containers of RCRA hazardous waste must be: • Maintained in good condition, • Compatible with hazardous waste to be stored, and • Closed during storage except to add or remove waste.	HAR Title 11 264-171, 264-172, and 264-173	Applicable	Substantive provisions are applicable if waste is determined to be RCRA hazardous waste.
Hazardous waste accumulation/Inspect container storage areas weekly for deterioration.	HAR Title 11 264-174	Applicable	Substantive provisions are applicable if waste is determined to be RCRA hazardous waste.

(Table continues)

Table 16 (continued)

Action/Requirement	Citation[b]	ARAR Determination	Comments
Hazardous waste accumulation/Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner.	HAR Title 11 264-175(a) and (b)	Applicable	Substantive provisions are applicable if waste is determined to be RCRA hazardous.
Site closure/At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers and liners.	HAR Title 11 264-178	Applicable	Substantive provisions are applicable if waste is determined to be RCRA hazardous.
Use of tanks or piping/Requirements for secondary containment of tank systems and ancillary equipment	HAR Title 11 264-193(b), (c), (d), (e), and (f)	Applicable	Substantive provisions are applicable for phytoremediation treatment unit and associated transfer piping.
Use of tanks or piping/Design requirements for a tank system	HAR Title 11 264-192	Applicable	Substantive provisions are applicable for phytoremediation treatment unit and associated transfer piping.
Use of tanks or piping/Upon closure of tank system, minimize the maintenance and remove or decontaminate all contaminated equipment and materials to the extent necessary to protect human health and the environment.	HAR Title 11 264-197(a)	Applicable	Substantive provisions are applicable for phytoremediation treatment unit and associated transfer piping.
Miscellaneous treatment units/Design requirements for miscellaneous treatment units.	HAR Title 11 264-600	Applicable	Substantive provisions are applicable for phytoremediation treatment unit.
Monitoring/Requirement for identifying chemicals of concern.	HAR Title 11 264-93	Relevant and appropriate	Substantive provisions are relevant and appropriate requirements for identifying groundwater-monitoring COCs. Not applicable because Del Monte Site is not a regulated unit.
Monitoring/Requirements for monitoring groundwater.	HAR Title 11 264-97(b), (d), and (e)(2)–(5)	Relevant and appropriate	Substantive provisions are relevant and appropriate requirements for groundwater monitoring. Not applicable because Del Monte Site is not a regulated unit.
Monitoring/Requirements for an evaluation monitoring program.	HAR Title 11 264-99(b), (c), (e), (f), and (g)	Relevant and appropriate	Substantive provisions are relevant and appropriate requirements for groundwater monitoring. Not applicable because Del Monte Site is not a regulated unit.

(Table continues)

Table 16 (continued)

Action/Requirement	Citation[b]	ARAR Determination	Comments
Corrective action/The owner or operator required to take corrective action to remediate releases from the regulated unit and to ensure that the regulated unit achieves compliance with the water quality protection standard.	HAR Title 11 264-100(b)	Relevant and appropriate	Substantive provisions are relevant and appropriate requirements for groundwater monitoring and corrective action for the release. Not applicable because Del Monte Site is not a regulated unit.
Corrective action/The owner or operator shall implement corrective action measures that ensure COCs achieve their respective concentration limits at all monitoring points and throughout the zone affected by the release, including any portions of the affected zone that extend beyond the facility boundary, by removing the waste constituents or treating them in place. The owner or operator shall take other action to prevent noncompliance due to a continued or subsequent release including, but not limited to, source control.	HAR Title 11 264-100(c)	Relevant and appropriate	Substantive provisions are relevant and appropriate requirements for groundwater monitoring and corrective action. Not applicable because Del Monte Site is not a regulated unit.
Monitoring/The owner or operator shall establish and implement, in conjunction with the corrective-action measures, a water quality monitoring program that will demonstrate the effectiveness of the corrective action program, effectively determine compliance with the water quality protection standard, and determine the success of the corrective-action measures under subsection (c) of this section.	HAR Title 11 264-100(d)	Relevant and appropriate	Substantive provisions are relevant and appropriate requirements for groundwater monitoring. Not applicable because Del Monte Site is not a regulated unit.
Completion of response action/Completion of the corrective action program must be demonstrated to be in compliance with the water quality protection standard based on the results of sampling and analysis for all chemicals of concern for 1 year.	HAR Title 11 264-100(g)(1) and (3)	Relevant and appropriate	Substantive provisions are relevant and appropriate requirements for groundwater monitoring. Not applicable because Del Monte Site is not a regulated unit.

(Table continues)

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Table 16 (continued)

Action/Requirement	Citation[b]	ARAR Determination	Comments
Hazardous waste must be labeled in accordance with DOT regulations before transport.	HAR Title 11 262-31	Applicable	Applicable for any operation where hazardous waste is generated on-site and transported. The determination of whether wastes generated during remedial activities are hazardous will be made when the wastes are generated.
Provides requirements for marking hazardous waste before transport.	HAR Title 11 262-32	Applicable	Applicable for any operation where hazardous waste is generated on-site and transported. The determination of whether wastes generated during remedial activities are hazardous will be made when the wastes are generated.
A generator must assure that the transport vehicle is correctly placarded before transport of hazardous waste.	HAR Title 11 262-33	Applicable	Applicable for any operation where hazardous waste is generated on-site and transported. The determination of whether wastes generated during remedial activities are hazardous will be made when the wastes are generated.
PERCHED AQUIFER – STATE (No action-specific State ARARs have been identified for the perched aquifer)			
BASAL AQUIFER – FEDERAL			
Resource Conservation and Recovery Act (42 U.S.C. §§ 6901–6991[i])[c]			
All of the ARARs cited above for the perched aquifer also apply to the basal aquifer. The phytoremediation treatment unit referenced for the perched aquifer, becomes the groundwater treatment unit for the basal aquifer.			
Underground Injection Control Program (40 CFR Part 144)			
Underground Injection Control regulations and permitting requirements for five general classes of injection wells.	40 CFR Part 144	Applicable (if injection wells used)	Applicable if groundwater injection wells used for recharge of treated groundwater. This is not currently planned, but may be considered if the volume of basal aquifer extraction exceeds Del Monte's water rights. The injection wells would be considered Class V injection wells.

(Table continues)

Table 16 (continued)

Action/Requirement	Citation[b]	ARAR Determination	Comments
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)			
Pesticide use/Requirements for a buffer zone around water wells.	FIFRA § 3 and 40 CFR Part 152 Subparts C and D	Applicable	Places restrictions on pesticide formulations containing 1,3-dichloropropene (including Telone II®, which is used on the Oahu plantation), that stipulate such formulations cannot be used within 100 feet of a water well. Will require establishment of a buffer zone around any monitoring, extraction or injection wells installed in or near pineapple fields.
BASAL AQUIFER – STATE (No action-specific State ARARs have been identified for the perched aquifer)			

Notes:

[a] many action-specific ARARs contain chemical-specific limitations and are addressed in this action-specific ARAR table

[b] only the substantive provisions of the requirements cited in this table are ARARs

[c] statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the entire statutes or policies are ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered ARARs

Acronyms/Abbreviations:

ARAR – applicable or relevant and appropriate requirement
CFR – Code of Federal Regulations
COCs – contaminants of concern
DOT – Department of Transportation
FIFRA – Federal Insecticide, Fungicide, and Rodenticide Act
HAR – Hawaii Administrative Rules
RCRA – Resource Conservation and Recovery Act
§ – section
U.S.C. – United States Code